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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/079,389

02/20/2002

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05/10/2004

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EXAMINER

WACHSMAN, HAL D

ART UNIT

PAPER NUMBER

2857

DATE MAILED: 05/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/079,389	Applicant(s) BOWLEY ET AL.	
	Examiner Hal D Wachsman	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 16-21 and 33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 22, 23 and 29 is/are rejected.
- 7) ☒ Claim(s) 5-15, 24-28 and 30-32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some    \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                                              |                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                                             | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2-17-04</u> . | 6) <input type="checkbox"/> Other: _____                                                |

1. The replacement sheet drawing for Figure 1 has been approved. However, as was stated in paragraph 3 of the previous Office Action, the drawings are objected to by the Draftsperson's for the reasons stated on the PTO-948 form that was attached to the previous Office Action. The Applicant's reply filed 2-17-04 on page 14 stated "Applicants respectfully defer submission of formal drawings until such time prosecution is closed on the merits". The Applicant though is respectfully directed toward paragraph 10 of the PTOL-326 form attached to the previous Office Action which clearly states:

**"Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a)."**

Consequently, any reply to this Office Action must include submission of formal drawings that appropriately correct the objections raised on the PTO-948 form as well as incorporating the change made to Figure 1 which has been approved.

2. The Remarks section of the reply filed 2-17-04, first paragraph, indicates "...applicants, at the present time, would like to obtain a patent including all the claims pending in the present application". However, claims 16-21 and 33 of the application are withdrawn claims being drawn to a nonelected species with no claim being deemed generic, in which the election was made **without** traverse in Paper No. 4. As the election was made without traverse, the Applicant has not retained the right to petition from the requirement under 37 CFR 1.144 (see MPEP 821.02) and therefore a complete reply to this Office Action should include cancellation of the non-elected claims.

3. Claims 2, 4-15, 23-28 and 32 are objected to under 37 C.F.R. 1.75(a) for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Claim 2, lines 4-5, cite "said plurality of edge width versus focus data points" which lacks clear antecedent basis. This same type of problem also occurs in claim 23, line 6. Claim 7, line 3, cites "said **feature**" which lacks clear antecedent basis. Claim 11, line 2, cites "said average edge width" however it appears that the actual antecedent basis for this is "average of said edge width measurements". Claims 12 and 13, lines 3 and 4, cite "said tool" which should be "said photolithographic exposure tool". This same type of problem also occurs in claim 27, line 3. Claim 14, line 2, cites "said equation" which should be "said derived equation". Claim 28, step e, cites "the wafer" which should be "the production wafer". The last step of claim 28, is now labeled as "[e]" possibly because the strike-through through the previous "c)" labeling now makes the "c" look like an "e", and this should just be labeled as "f)". Claim 32, line 3, cites "seventh computer readable program code" however this claim depends from claim 30 and there was not a sixth computer readable program code cited in claim 30. The examiner asks the applicant to better claim the limitations cited above. While the examiner understands the intentions of the applicant he feels confusion could be drawn from the limitations cited above. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 22, 23 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Ausschnitt et al. (5,976,740).

As per claim 1, Ausschnitt et al. (Abstract, figures 9-16, col. 4 lines 4-6, col. 5 lines 54-56, col. 14 lines 19-23, col. 17 lines 1-8, 39-43, col. 26 lines 5-8, 45-67) disclose "making measurements of three dimensional feature changes in a photosensitive resist, wherein said measurements of three dimensional feature changes include a plurality of edge width measurements". Ausschnitt et al. (Abstract, col. 4 lines 21-41, col. 17 lines 1-8, 39-43, col. 26 lines 5-8, 45-67) disclose "generating a function which defines....and said focus of said photolithographic exposure tool". Ausschnitt et al. (Abstract, col. 5 lines 23-28, 57-63, col. 6 lines 25-39, col. 16 lines 36-53, col. 17 lines 36-47) disclose "computing from said function a best profile focus value....for controlling the focus errors of said photolithographic exposure tool".

As per claim 2, Ausschnitt et al. (col. 17 lines 1-8, 39-43, col. 26 lines 5-8, 46, 47, 55-58) disclose the feature of this claim.

As per claim 3, Ausschnitt et al. (Abstract, figures 9-16, 20, 21) disclose the feature of this claim.

As per claim 4, Ausschnitt et al. (figures 9-16, col. 26 lines 45-67) disclose the feature of this claim.

As per claim 22, Ausschnitt et al. (Abstract, figures 9-16, col. 4 lines 4-6, col. 5 lines 54-56, col. 14 lines 19-23, col. 17 lines 1-8, 39-43, col. 26 lines 5-8, 45-67) disclose "means for measuring three dimensional feature changes by a plurality of edge width measurements in a photosensitive resist". Ausschnitt et al. (Abstract, col. 4 lines 21-41, col. 17 lines 1-8, 39-43, col. 26 lines 5-8, 45-67) disclose "function generation means for defining a relationship between said plurality of edge width measurements and focus of said photolithographic exposure tool". Ausschnitt et al. (Abstract, col. 5 lines 23-28, 57-63, col. 6 lines 25-39, col. 16 lines 36-53, col. 17 lines 36-47) disclose "means for determining from said function a best profile focus value....to control the focus errors of said photolithographic exposure tool".

As per claim 23, Ausschnitt et al. (col. 17 lines 1-8, 39-43, col. 26 lines 5-8, 46, 47, 55-58) disclose the feature of this claim.

As per claim 29, all the features of this claim have already been addressed in claim 1 above with the exception of the method of the invention being embodied in a computer usable medium having computer readable program code to be executed by a computer. While Ausschnitt et al. does not explicitly state this feature, figures 19-21 clearly show flow charts (i.e. flow charts of a program) and col. 1, lines 27-30, of Ausschnitt et al. disclose the collection and analysis of critical dimension measurements using SEM metrology and it is inherent in the art that scanning electron microscopes (SEMs) are automated tools with software programming.

6. Claims 5-15, 24-28 and 30-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims and subject to the appropriate correction of the 37 C.F.R. 1.75(a) objections noted above.

Claims 5-15 would be allowable over the prior art if rewritten as described above because the prior art does not disclose or suggest retaining a plurality of edge width vs. focus data points, which are from measurements of three dimensional feature changes in a photosensitive resist, for a default exposure level.

Claims 24-28 would be allowable over the prior art if rewritten as described above because the prior art does not disclose or suggest a function generation means for defining a relationship between three dimensional feature measurements and a focus of a photolithographic exposure tool which includes a means for deriving an equation which characterizes edge width versus focus data point for a default exposure level.

Claims 30-32 would be allowable over the prior art if rewritten as described above because the prior art does not disclose or suggest computer readable program code for inputting to a function, which defines a relationship between three dimensional feature measurements and a focus of a photolithographic exposure tool, an average of measurements made on a specific three dimensional feature type across an exposure field on a production wafer to derive a measured focus of the specific three dimensional feature type on the production wafer.

7. Applicant's arguments filed 2-17-04 have been fully considered but they are not persuasive. On page 19 of the reply the Applicant argues "The three dimensional profile measurements represent the sidewall angle of the photosensitive resist in the Z-axis.

The sidewall angle is determined by measuring at least the edge line width of design features". However, with respect to the claims that remain rejected above the Applicant is arguing unclaimed merits or distinctions here. As far as the arguments concerning "the measurements include edge line width measurements" this type of feature was previously cited in dependent claims 2 and 4 for example, however no arguments were presented by the Applicant with respect to the sections of Ausschnitt et al. which were applied against those claims in the previous Office action. In addition, as was cited in paragraph 11 of the previous Office action, "The following references are cited as being art of general interest: Archie et al. which disclose critical dimension and tool resolution determination using **edge width**" in which the Archie et al. reference provides further evidence that what the Applicant is arguing here was notoriously well known in the prior art. On page 20 of the reply the Applicant further argues "Applicants' method determines changes in the sidewall angle of the photoresist profile in the z-axis through edge width measurements." however here the Applicant is arguing with respect to the rejected claims above, an unclaimed merit or distinction.

**8. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any




extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hal D Wachsman whose telephone number is 571-272-2225. The examiner can normally be reached on Monday to Friday 7:00 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Hoff can be reached on 571-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Hal D Wachsman  
Primary Examiner  
Art Unit 2857

HW  
May 7, 2004